

**Notice of Allowability**

Application No.

10/518,239

Examiner

Marisol Figueroa

Applicant(s)

ROBINSON ET AL.

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**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--**

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to application filed on 12/16/2004.
2. ☒ The allowed claim(s) is/are 1-9.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some\* c) ☐ None of the:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

\* Certified copies not received: \_\_\_\_\_.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.  
**THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.**

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
- (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
- 1) ☐ hereto or 2) ☐ to Paper No./Mail Date \_\_\_\_\_.
- (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date \_\_\_\_\_.
- Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

**Attachment(s)**

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date \_\_\_\_\_
- ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
- ☐ Notice of Informal Patent Application (PTO-152)
- ☐ Interview Summary (PTO-413), Paper No./Mail Date \_\_\_\_\_
- ☒ Examiner's Amendment/Comment
- ☒ Examiner's Statement of Reasons for Allowance
- ☐ Other \_\_\_\_\_

### EXAMINER'S AMENDMENT

1. An examiner's amendment to the record appears below. Should the changes and/or additions be unacceptable to applicant, an amendment may be filed as provided by 37 CFR 1.312. To ensure consideration of such an amendment, it MUST be submitted no later than the payment of the issue fee.

Authorization for this examiner's amendment was given in a telephone interview with Frank Presta (19828) on 12/20/2005.

The application has been amended as follows:

In the Claims:

1. (currently amended) A method of estimating the location of a device within a network of devices each of which forms a node of the network such that the device may communicate with any other node in the network either directly or indirectly via intermediate devices, the ~~or each other~~ device within the network with which the device may communicate directly being referred to as a neighbouring node, the method including the steps of:

obtaining information specifying the location or estimated location of one or more of the neighbouring node or nodes;

measuring the distance from the device to said one or more neighbouring nodes;

iteratively modifying an estimated location of the device, so as to reduce an error function based on the inconsistency between the estimated location of the device and the location or estimated location of the ~~or each of the~~ one or more neighbouring nodes, as determined from the obtained information specifying the location or estimated location of the one or more neighbouring nodes, on the one hand and the measured distance or distances from the device to the ~~or each of the~~ one or more neighbouring nodes on the other hand; and

periodically determining whether or not to implement a reset procedure, on the basis of whether or not certain conditions are met, by which the estimated location of the device is reset to a new location in a manner which does not seek to reduce the error function in respect of the new location relative to the immediately preceding estimated location of the device, whereby the device can avoid getting its estimated location stuck in a position corresponding to a local minimum value of the error function.

2. (currently amended) A method as claimed in claim 1 wherein the error function depends on the square, or the sum of the squares, of the difference or differences between the ~~or each~~ one or more hypothetical distances from the device to the ~~or each~~ one or more neighbouring nodes on the one hand and the measured distance from the device to the ~~or each~~ one or more respective neighbouring nodes on the other hand, where the hypothetical distance from the device to a neighbouring node is the distance between the estimated position of the device and the location or estimated location of the respective neighbouring node as obtained.

3. (currently amended) A method as claimed in either preceding claim wherein the network is a wireless ad-hoc network, and wherein the device communicates with the ~~or each~~ one or more of its neighbouring nodes in a wireless manner.

In the Specification:

On Page 14 --- FIGS. 44 11a and 11 b is a flow chart of the iterative procedure performed by the devices illustrated in FIGS. 9 and 10 not having a priori knowledge of their position;

***Reasons for Allowance***

2. Claims 1-9 are allowed.
3. The following is an examiner's statement of reasons for allowance:

Regarding independent claims 1, 8, and 9, CASTRO et al (US 2004/0109417 A1) is made of record as teaching a device and method of estimating the location (e.g. coordinates) of a device (e.g. subject node) considering designated coordinates of other positioned or reference nodes (i.e. neighbouring nodes) within the network (abstract). The method begins by determining the coordinates of the reference nodes (p.0033-0034), then measuring a network distance between the subject node and each of the reference nodes (p.0035) and estimating the coordinate of the subject node based on the measured distances between the subject node and each of the reference nodes (p.0036). Then an optimization algorithm starts with an initial estimation of the coordinates of the subject node and calculate errors between the measured distances and the computed coordinate distance (i.e. hypothetical distance); after a first pass the algorithm determines a new estimation of the subject node coordinates and iterates to find the optimal location (e.g. coordinates) of the subject node that minimize the error between the measured distances and the computed coordinate distances (p.0036-0039).

However, the cited prior art does not disclose the step of periodically determining whether or not to implement a reset procedure, on the basis of whether or not certain conditions are met, by which the estimated location of the device is reset to a new location in a manner which does not seek to reduce the error function in respect of the new location relative to the immediately preceding estimated location of the device, whereby the device can avoid getting its estimated location stuck in a position corresponding to a local minimum value of the error function.

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**Regarding claims 2-7**, these claims are allowed as being dependent upon independent claims that have been allowed

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

### ***Conclusion***

4. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Bajikar (US 2004/0203872 A1) – Wireless Network Location Estimation.

Hamdi et al. (US 2004/0203380 A1) – Method and Wireless Terminal for Generating and Maintaining a Relative Positioning System

Gwon et al. (US 2004/0203904 A1) – Selective Fusion Location Estimation for Wireless Access Technologies

Kuwahara et al. (US 2003/0191604 A1) – Position Calculation Method and Position Calculation Apparatus.

### ***Contact Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Marisol Figueroa whose telephone number is (571) 272-7840. The examiner can normally be reached on Monday Thru Friday 8:30 a.m. - 5:00 p.m..

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Joseph Feild can be reached on (571) 272-4090. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

  
Marisol Figueroa  
Art Unit 2681

  
ERIKA A. GARY  
PRIMARY EXAMINER